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## Outlook and Management Considerations for Corn Belt Grain Farming 1977-1982

John E. Kadlec

Bob F. Jones

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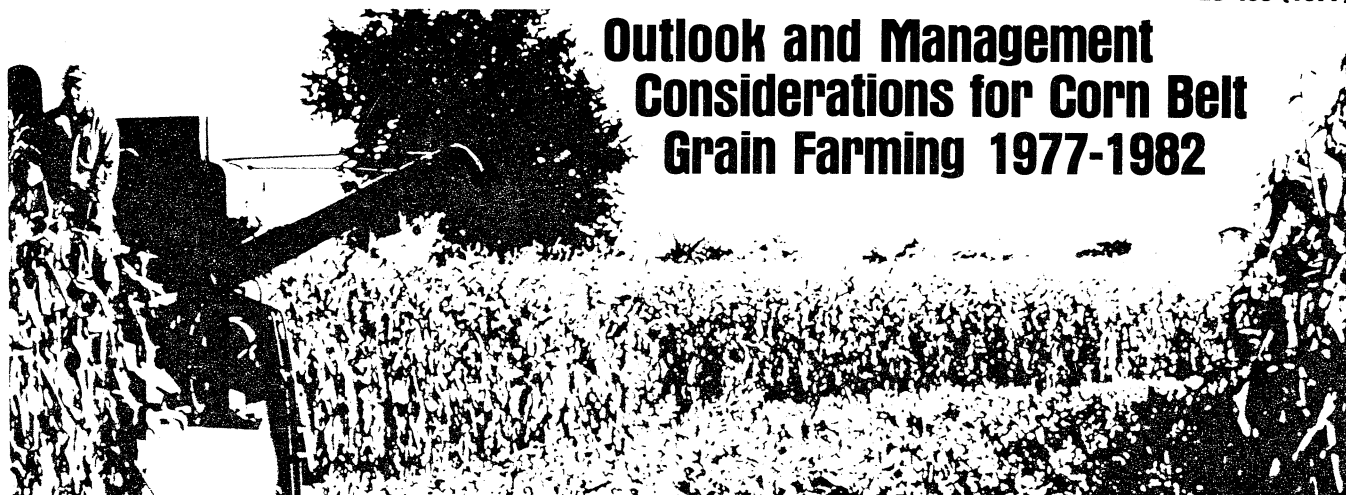
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## Outlook and Management Considerations for Corn Belt Grain Farming 1977-1982

What's ahead for grain farming in the Mid-West over the next 5 years? Where will market prices for corn, soybeans or wheat likely be next year, in 1980, in 1982? Will production costs level off or keep rising? What conditions will impact most significantly on grain supplies and demands? What can the producer do to maximize his opportunities for profit?

This publication deals with these and related questions affecting grain farming over the 5-year period 1977-82. It discusses the factors likely to influence the grain outlook picture, presents the implications of these factors on price and profit, and suggests management strategies the grain farmer should consider during this period.

### OPERATING ENVIRONMENT FOR GRAIN PRODUCTION AND PRICES—1977-1982

From 1954 to 1973, world agricultural production increased at a rate of 2.8 percent per year, while population increased at 2.0 percent per year. Hence, per-capita consumption increased about 0.8 percent per year.

In the developed countries, production grew more slowly than the world average rate, since large stocks of grain were available and government programs were designed to restrict production and raise farm income. In the less developed countries, although production grew at a more rapid rate, per capita consumption rates increased less rapidly because of larger popu-

lation growth rates. Except for some areas in Africa, per capita consumption rates increased in all areas of the world over the 20-year period.

In the two decades prior to 1972-73, world food prices tended to be stable or declined in real terms, especially in developed countries. After 1972, however, food and farm product prices in market economies and in international markets rose sharply due to short crops in 1972 and 1974, devaluation of the U.S. dollar, changing trade policies and rising consumer incomes.

In the next 5 years, the price outlook for corn, soybeans and wheat will depend mainly on (1) the rate of change in the capacity of the agricultural fixed plant, (2) changes in demand for agricultural products, (3) the weather and (4) actions of governments both in the U.S. and abroad.

It is becoming increasingly important to view these factors in a world context.

United States exports amount to about two thirds of our wheat crop, over 50 percent of our soybean crop when meal and oil are included and about one fourth of our corn crop. U.S. exports of feed grain, wheat and soybeans account for about half the total world trade in these products.

Because of this nation's relatively open economy, events outside the U.S. over the past 4 years have had a large role in determining prices U.S. farmers received, their incomes and food costs to U.S. consumers. And outside events will continue to affect the well-being of U.S. producers and consumers.

## Capacity of the "Fixed Plant"

Much of the input to produce corn, soybeans and wheat is fixed in the short run.<sup>1/</sup> Both upward and downward adjustments in the quantity of resources used take time. Fixed resources are so relatively important at any point in time that only minor adjustments in variable resources are economically feasible. Hence, for given weather, the amount of agricultural production is largely determined by the capacity of the existing "fixed plant."

When farm crop prices are high relative to other prices, the fixed plant is increased; when crop prices are low relative to other prices, little investment is made in the fixed plant -- other things being equal.

During the late 1940's and early 1950's, farm prices were relatively high, and investment in the agricultural fixed plant was substantial. This investment -- combined with technological advances in seeds, chemicals and fertilizers -- resulted in an agricultural fixed plant with overcapacity, which, in turn, led to relatively low farm crop prices from 1956-71. These price pressures discouraged both investments in the agricultural fixed plant and emphasis on production-increasing technologies.

Increased prices since 1972 have again triggered increased investment in the fixed plant -- more land, more machinery, more labor, more management, more land improvement, more fertilizer plants, etc. For example, from 1972 to 1975, land devoted to crops in the U.S. increased 10 percent, labor used in all crops increased 3 percent, and tractor horsepower on farms was up 6 percent.<sup>2/</sup> In addition, the number of young people returning to the farm has in-

creased greatly since 1972. Although aggregate data are not yet available, it is believed that continued additions to the fixed plant occurred in 1976 and continued in 1977.

Prices of agricultural products relative to non-agricultural products did not rise in other developed countries to the extent they did in the U.S. In Western Europe and Japan, farm prices are controlled through commodity programs and trade policies. These prices generally were already much higher than in the U.S. prior to 1972. For this reason, one would not expect the same investment response in Western Europe as occurred in the U. S.

However, the European Community (EC) continues to adjust its support prices up each year, based on changes in costs of production. Therefore, output expansion in the EC has not yet run its course in response to higher prices. (EC countries purchase about a third of U. S. agricultural exports.)

Although solid aggregate data are lacking, it is known that investment in the agricultural fixed plant is occurring in other parts of the world. Outstanding examples include investment in Brazil in soybean production, in Malaysia and West Africa in palm oil production, and in the USSR in irrigation facilities for increased grain production. Acreage devoted to wheat and coarse grain production has also been increasing since 1972 in Argentina, Australia and Canada.

Current and planned investment in manufacturing facilities for fertilizer, especially nitrogen, is expected to relieve recent production bottlenecks in that industry. Although nitrogen fertilizer production is a heavy petroleum user, its capacity of the fixed plant and the capital-intensive nature of its production which have limited output expansion -- not the scarcity of raw materials, as is commonly believed.

It is the judgment of those close to crop technology that U.S. production increases in corn, soybeans and wheat due to new developments and their continued adoption will likely be 1 to 2 percent per year for the next 5 years. In addition, production in-

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<sup>1/</sup>At present, machinery ownership, land ownership, labor and management account for 60 percent of the cost of production. In addition, many inputs in the farm supply industry are also fixed -- fertilizer plants, seed processing plants, chemical plants, etc.

<sup>2/</sup>USDA, ERS, Changes in Farm Production and Efficiency, A Special Issue, Statistical Bulletin No. 581, September, 1976.

crease due to use of increased inputs will probably add another 1 to 2 percent per year. Hence, total capacity of the U.S. agricultural production plant for corn, soybeans and wheat is likely to increase 2 to 4 percent a year during the next 5 years.

### Changes in Demand

Worldwide, the demand for food has been increasing because of population growth and increased consumer incomes. In the United States, this demand will continue to grow but at a slower pace than it did during the 1960's, because the population growth rate has slowed significantly and because consumer incomes are likely to grow at a slower rate than they did during the 1960's.

World food demand will likewise continue to grow. Since about 85 percent of projected world population growth will occur in the less developed countries, where purchases are more limited by available income, population growth will not translate directly into increased effective demand for food. Overall, world food demand is expected to grow at the rate of about 2.4 percent per year -- 2.0 percent coming from population growth and 0.4 percent from income growth which affects food demand.

### Weather Implications

The combined effect of adoption of new technologies and additional investment in the agricultural fixed plant will provide agriculture with the capacity to increase food production faster than population growth during the next 5 years -- if weather cooperates. Some experts contend that a drought period is here, while others hold that each year's weather is independent of other years' weather. This latter group would suggest that a near-normal year is most likely, with only one chance in ten of having a U.S. corn crop 10 percent or more below normal.

When intelligent, well-informed people make different forecasts, there is a reason-

able chance for each of them to be right. During the 5 year period 1977-82, one would expect the combination of bad, normal and good years to result in production close to average (6.3 billion bushels of corn per year based on expected acreage and yield).<sup>3/</sup> However, with present world corn stocks at moderate levels and soybean stocks at relatively low levels, the sequence of good and bad years is the key consideration.

### Government Policy

U.S. domestic policy will continue to be concerned with the level of consumer food prices as they are affected by farm product prices. Consumers desire a reserve policy or more drastic measures, such as price or export controls, to remove extreme price peaks. Producers will resist such proposals but will tend to favor some form of price and income support. As price supports are moved up, government-acquired or government financed stocks in farmers' hands will accumulate. The amount of U. S. Treasury support for agriculture may be limited by the administration's emphasis on a balanced budget by 1981.

Foreign governments will likely continue their more positive attitudes toward increasing agricultural production as long as "short-ages" are a recent memory.

As food production receives higher priority, more funds will likely be available for research on new varieties and technologies, for investment in irrigation and for other capital items. Terms of trade favorable for agricultural products will receive greater consideration in some countries that have traditionally discriminated against agriculture.

Policies toward food production in other countries are influenced by recent use of export controls by the U.S. and by foreign considerations. More emphasis will be placed on self sufficiency programs, which

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<sup>3/</sup>Acreage is assumed to be 70 million harvested acres and yield is 90 bushels per acre.



tend to limit growth of U.S. agricultural export markets in the short run. Also, growing balance-of-payments considerations in many less-developed countries will constrain U.S. export growth. However, in the longer run, to the extent that increased food production contributes to general economic development, export markets for agricultural products are likely to grow.

#### Grain Price Expectations for 1977-1982

In the general economy, an annual inflation rate of 4 to 8 percent is likely, but the cost of some farm inputs may increase at a slower rate. From 1972 to 1975, prices for most farm inputs increased at a greater rate than the average rate of inflation. As production bottlenecks are removed, some realignment in prices has occurred and will probably continue to occur. List prices should increase with the general price level; but as input supplies increase and demand for them moderates, discounts will likely offset some of the list price increase.

With weather, production and exports the key determinants, it appears that the odds are seven out of ten that corn prices will average \$1.90-2.50, bean prices will be \$4.50-6.00, and wheat prices \$2.25-3.25 during the next 5 years (farm level prices). There are two chances out of ten that prices will average below this level, and one in ten they will average above this level. Grain prices, unlike most other prices, will not fully reflect changes in the inflation rate.

Corn, soybean and wheat prices will continue below 1973-74 peaks, having declined to below revised government support levels for corn and wheat. However, prices are not likely to remain at floor levels but will fluctuate with changing market conditions, unless large stocks of grain are again accumulated with changing market conditions.

In summary, grain prices over the next 5 years will be favorable for farmers by pre-1972 price-cost standards, but not as

high in relation to production costs as during the 1973-1977 period. Variation within and between years will remain sizeable, but not as great as during 1973-1977.

## **IMPLICATIONS OF THE CHANGING ENVIRONMENT FOR GRAIN FARMERS**

### A. Land will become more difficult to obtain.

Relatively high corn, soybean and wheat prices have attracted many people into farming. Farms which would have been rented to neighbors are now being farmed by the owners, their relatives or associates. Recent sizeable increase in machinery, labor and management inputs will result in fierce competition for land; and the addition of livestock enterprises will be necessary to provide full time jobs for the operators of many grain farms.

This competition for land will continue to put upward pressure on its price and on cash rental rates. It will also encourage both tenants and landlords to make a variety of changes in crop share leasing arrangements.

Farmers need to put emphasis on strategies for securing land and should plan to use land as intensively and effectively as possible (i.e., drainage, double-cropping, fertilization, timeliness, etc.).

### B. The level of uncertainty will be high.

Uncertainties create financial dangers but also opportunities for profit, if one uses management strategies appropriate for the times. The following three guidelines may help in developing such strategies.

Guideline #1 -- Evaluate the consequences of alternative product price, yield and cost possibilities before making major decisions. In a period of uncertainty, de-

cisions should be made not only on the basis of what one thinks is most likely to happen, but also considering the probabilities and consequences of other occurrences. One needs to analyze the possible consequences of a decision for each of the different situations that have a significant chance of occurring. Computerized decision-making budgeting tools can be helpful for quickly making these calculations.

For instance, if one is considering buying a farm for \$1,600 an acre and plans to borrow \$1,000 per acre, he should budget both cash flow and profit for a variety of corn price and yield situations (Table 1) then put "odds" on the probability of each situation occurring. These calculations, in light of an individual's goals, financial position and risk preference, will provide the basis for a decision.

Table 1. Ability to Make Mortgage Payments, Owner Operated Farm (Borrowed \$1000/Acre at 9% for 20 Years).

Corn yield	Dollars per acre remaining * after paying all costs and mortgage payments when corn price is --			
	\$1.80	\$2.20	\$2.60	\$3.00
130 bu.	-\$35	\$17	\$69	\$121
110 bu.	-\$71	-\$27	\$17	\$61
90 bu.	-\$107	-\$71	-\$35	-\$1

\* "Dollars per acre remaining" after all costs including machinery depreciation, operator labor and management, and land interest, principal and tax payments. No allowance for the \$600 equity in land.

Guideline #2 -- Be aware of increased risk resulting from higher capital and other costs and from widely fluctuating prices. Capital investment per commercial farm has more than doubled during the past 5 years and will likely be at least three times as great in 1980 as in 1970 (Table 2); interest rates have also jumped during the past several years. The net result is that annual capital costs per farm in the late 70's are as much as four times higher than they were prior to 1970. Records from Purdue Farm Account co-operators illustrate the impact.

Table 2. Average Characteristics and Earnings of Indiana Farm Account Cooperators.\*

	Unit	1955-59	1960-64	1965-69	1970-72	1975	Projection 1980
Acres per farm							
Total	acre	279	352	450	506	574	650
Tillable	acre	224	272	378	427	493	600
In corn	acre	91	120	208	257	272	400
Corn produced per acre	bu.	73	93	101	107	109	115
Feeder cattle bought per farm	no.	18	28	47	49	153	250
Hogs raised per farm	no.	264	335	415	503	910	1,200
Capital invested per farm**							
In real estate		\$58,993	\$82,936	\$160,173	\$203,712	\$423,058	\$900,000
In machinery, equipment		9,417	11,645	19,339	25,823	43,022	70,000
In livestock, feed, supplies		19,086	25,870	41,570	61,802	121,080	140,000
TOTAL		\$87,496	\$120,351	\$221,082	\$291,337	\$587,160	\$1,110,000
Men per farm	no.	1.68	1.72	1.88	1.99	2.17	2.40
Net farm income		\$7,356	\$12,011	\$23,110	\$32,055	\$68,094	\$60,000- 80,000
Income to labor and management		\$3,001	\$5,994	\$12,056	\$17,488	\$38,736	\$11,000- 31,000
Rate earned on investment	pct.	4.3%	5.6%	6.5%	6.9%	7.9%	5%-7%

\*These data were prepared by the Farm Management Staff at Purdue University. Each column is an "average" profile of a full-time, highly competitive crop and livestock farm based on Indiana farm account records.

\*\*These figures are a summary from farm records. They are adjusted as prices change, but they often lag behind market values. They are likely lower than actual market values for the 1955-1980 period.

The average investment of cooperators for the period 1970-72 was \$291,000. By 1980, it is projected to be \$1,110,000 (Table 2). If the interest rate was 7.5 percent in 1970-72, capital cost per farm was \$21,825. If the 1980 interest rate is 9 percent, capital cost per farm will be \$99,900. And even at 7.5 percent, it would be \$83,250. The capital cost per man in 1980 would be \$34,688 to \$41,625 (depending on interest rate), compared to \$11,000 in 1970-72.

The implications of this for the farm operator are that, first of all, he will need more capital. And, if he borrows this capital, he will have an increased intermediate and long-term fixed commitment, because most of the investment is in land, buildings and machinery. Therefore, he's more vulnerable in a situation of declining price or crop failure. It is quite likely that agricultural product prices will continue to fluctuate widely for the next 5 years, unless the current government program is changed. Therefore, some farmers need to take action to limit risk depending on their risk preferences and debt-equity ratio.

Farmers who have accumulated land over the years have had a substantial increase in net worth because of increased land prices. Also, they may have locked-in lower interest rates on long-term land mortgages. Many of these farmers are in a strong financial position and can stand high price risk.

Guideline #3 -- Take steps to keep risk levels in line with goals and capital position. Not all of the following steps will be acceptable to every farmer, and some of these actions might decrease income. But here are things that can be done to control risk.

- Implement big decisions in small steps over time (e.g., spread sales, buy land a little at a time, build facilities over a period of years).
- Calculate cash flows for a range of price and yield possibilities before making long-

term debt commitments for land, buildings or machinery.

- Use appropriate marketing strategies for the price and production situation (contracting or storage).
- Give production efficiency and marketing first priority and volume second priority.
- Arrange with the credit institutions for debt repayment periods to be as long as allowable.
- Time debt repayment to coincide with sales of crops and livestock. Credit institutions often allow much more flexibility in time of payments than used by borrowers.
- Keep in a liquid financial position. This essentially means careful control of borrowing for resources which must be paid for faster than they are depleted, and caution about purchasing resources which would sell for substantially less than they cost.
- Diversify by producing both crops and livestock. The year 1974 was not a good one for most livestock farmers. However, those who raised their own feed offset low livestock returns with good crop returns. Similarly, livestock enterprises may be profitable during a year when crop enterprise profits are less favorable. Crop diversification also provides some protection against risk of drouth and variable prices.
- Crop share rather than cash rent.
- Lease rather than buy, which includes hiring custom work rather than buying all needed machines.
- Do some work for guaranteed pay such as custom work.
- Jointly own or swap equipment with neighbors.
- Cut down on the percent and amount borrowed; avoid over-extension in debts for land and buildings at high interest rates.
- Find a partner with money or equipment to exchange for labor and management.
- Minimize production risk by having adequate amounts of labor and machinery to get the job done on time.



- C. Size of farms (in acres) will increase more slowly in the next 5 years than in the past decade.

Recent higher incomes and increased equity will allow survival on many smaller units. Also, competition for land will inhibit growth. Farmers on small acreages should take care not to become over-equipped. With increasing machinery size, some farmers will have larger equipment than their acreage can support.

With recent increases in machinery prices and capital costs, it will be more important to run machinery long hours to cut fixed cost per acre. Therefore, farmers need to explore various equipment share arrangements. The trend toward larger machinery will continue but many farmers will find smaller machinery or machinery share arrangements most economical.

- D. Benefits from two or more persons operating a farm business will increase.

Various kinds of arrangements will be used to enable two or more operators to work together to realize the economies to size in purchasing, using large machines and buildings, and selling. Specific examples where benefits might be gained include: using large machinery, sharing grain storage and handling facilities, buying in large quantities and sharing stages of swine production (farrowing and feeding).

- E. Corn will generally continue to be the most profitable crop on good land in the Corn Belt.

There is less world competition in corn production than in wheat production. Soybeans will continue to compete with corn in the Corn Belt, but their profitability will vary from year-to-year as producers adjust corn and soybean acreage to changing relative prices for the two crops. Corn will tend to be more profitable on good land. On

drouthy, less productive land, soybeans, wheat and double-crop may be more profitable and in a particular year wheat or soybeans may be more profitable.

- F. Legal organization, estate transfer and tax strategies will be more important during the next 5 years.

Higher land values have made the business transfer problem much more important. In the next 5 years, Corn Belt grain farming will continue to be mainly family-type businesses. Transfers from one generation to the next without major business disruption will require careful estate planning. It is not easy to identify the need in time to find a satisfactory solution. Thus, farmers should seek guidance in developing transfer plans for their lifetime.

With capital per farm and number of men per farm increasing, farmers will need to develop organizational systems which define how labor, capital and management are contributed and how income is shared. With higher value assets and income, and more complex operating arrangements, accounting and tax considerations will increase.

- G. New technologies will emerge, but at a modest rate.

Yield increases from new technologies are likely to be 1-2 percent per year during the next 5 years. Among the potential technologies emerging in grain production are: seed varieties and growth stimulants for corn, equal spacing and foliar feeding for soybeans, and improved seed varieties for wheat. Crop technologists advise, however, that the impacts of these changes are likely to be modest; a major breakthrough is not expected.

- H. With capital requirements of \$300,000-1,000,000 per man, financial management will become increasingly critical.

Sources of capital, cash flow, discounted returns, tax management, financial



control systems, records and evaluations will be important areas for all grain farmers, with entrepreneurial responsibilities to understand.

- I. With variable product prices and changing input prices, choice of time and place to buy and sell will continue to be very important.

A 1 percent change in input or product prices will result in much greater percentage change in profits.

## SUMMARY

The outlook for grain farming in the Corn Belt in the next 5 years is likely to be good but variable. Grain farming will become more competitive. Farmers will find land more difficult to obtain and, thus, will need to put more effort into securing land and making maximum use of land they control.

Farmers should make decisions on the basis of ranges of prices and yields with relative probabilities, rather than on the basis of a single price and yield estimate. They will need to take steps to control risk

at levels acceptable for their individual goals and financial situations.

Farm size will increase more slowly. It will be necessary for many farmers to raise livestock in order to have a full time job and to decrease risk. They will need to have sufficient machinery to achieve timely operations, but at the same time fully utilize all the machinery they have. The trend to larger machinery will continue, but many farmers will find smaller machinery or machinery share arrangements most economical. Benefits for farmers working together will increase.

New technologies will continue for corn, soybeans and wheat; but the impact will be modest -- 1 to 2 percent increase in yield per year. Financial management, legal organization, farm transfer, tax strategies and management arrangements for multi-man farms will be more important, as will be skill in selling products and buying resources.

The 5 years ahead will be a time when the income opportunities for grain farmers should be reasonably good. It will be a time in which high level managers can make good returns and poor managers can experience financial difficulties. It will be a challenging time to manage a farm, and the rewards to excellent management will be good.

by John E. Kadlec and Bob F. Jones  
Agricultural Economics Department, Purdue University

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